

Industrial Indoor Air Quality and Energy Efficiency

Mike Freeman
PlymoVent Corp.



Mike Freeman

- ***Chemical Engineer***

Process Engineering

Facilities Management

- ***Twelve Years Designing, Applying, Installing Industrial Air Cleaning Systems.***

100s of mist and smoke collection systems designed and installed.

-Media and ESPs (Individual and Central)

- ***Private Consulting***

Air Quality

Energy Management

PlymoVent Worldwide



Primary Markets:

**Subsidiaries in USA, Canada,
Germany, France and UK.**

PlymoVent Product Segments



Industrial



Pharmaceutical



Vehicle Exhaust

Fire House

What Do You See?



Jobs Facilities People Welding
Machining Manufacturing Energy Use
Energy Production Environmental Impact

Safety

Health

Labor

Air Quality

Productivity

Energy

Equipment

Facility

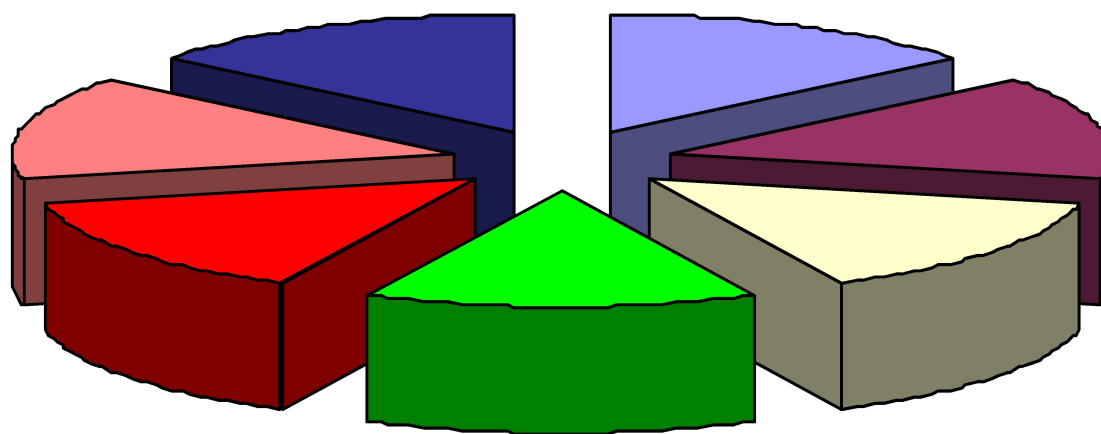
Not Energy Use or IAQ

- ***People want services & products***
- ***Comfortable Living and Working Conditions***
- ***Productive and Cost Effective Environments to produce products***

What does Indoor Air Quality Have to Do with This Area?

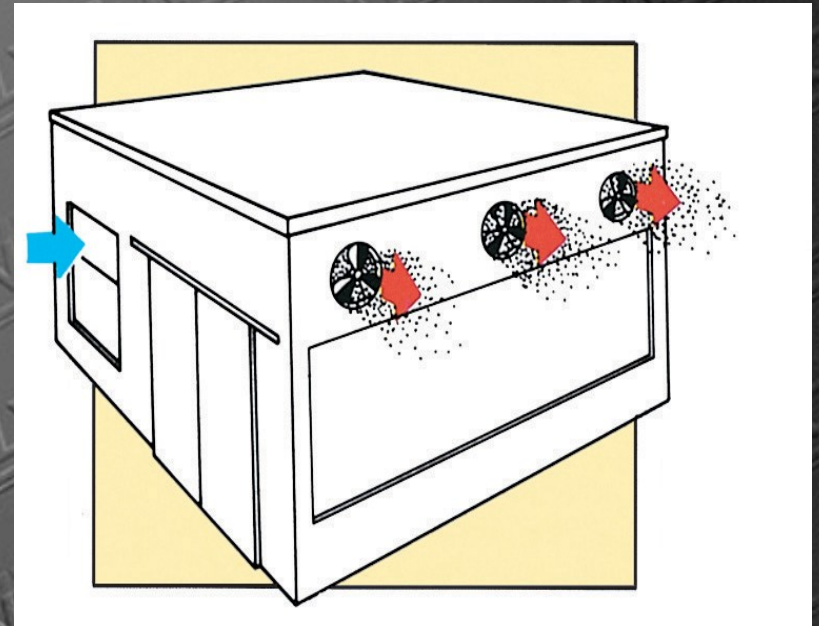
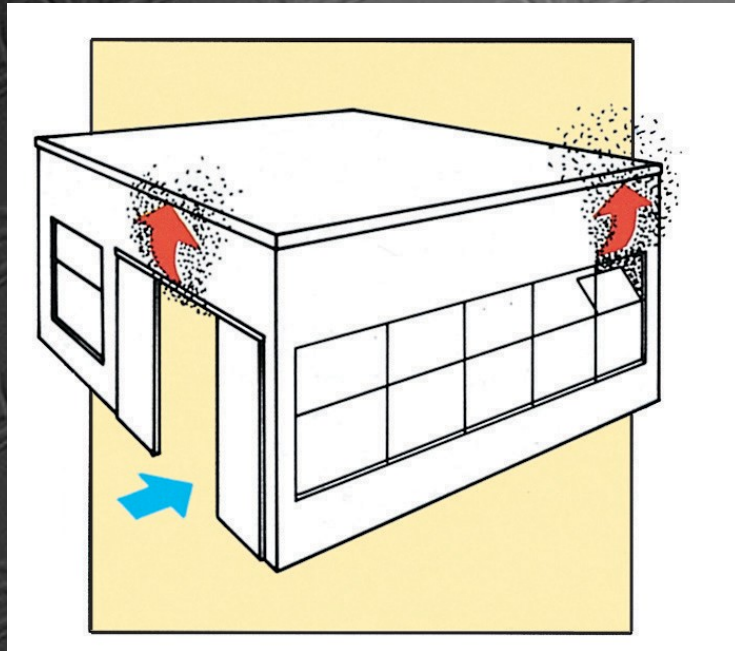
- ***Current Mindset is to ventilate the entire facility at 100% capacity***
- ***People don't believe that contamination can be captured without slowing down production***
- ***Energy Consumption and Indoor Air Quality go Hand In Hand***

Overall Solution Life Cycle Cost



- Equipment
- Energy
- Labor
- Filters
- Disposal
- Facility Maintenance
- Liability

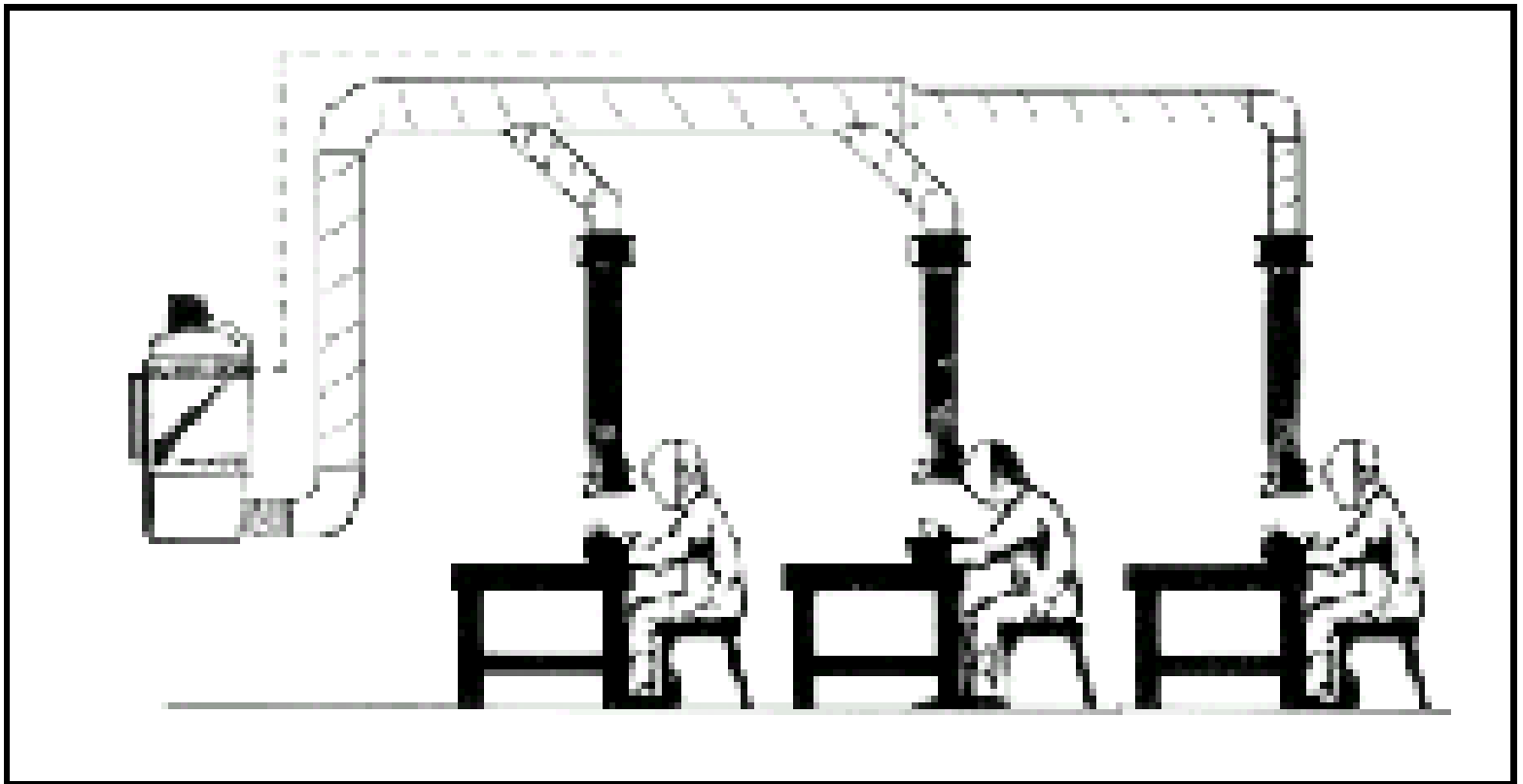
Ambient – Natural, Forced MUA & Exhaust

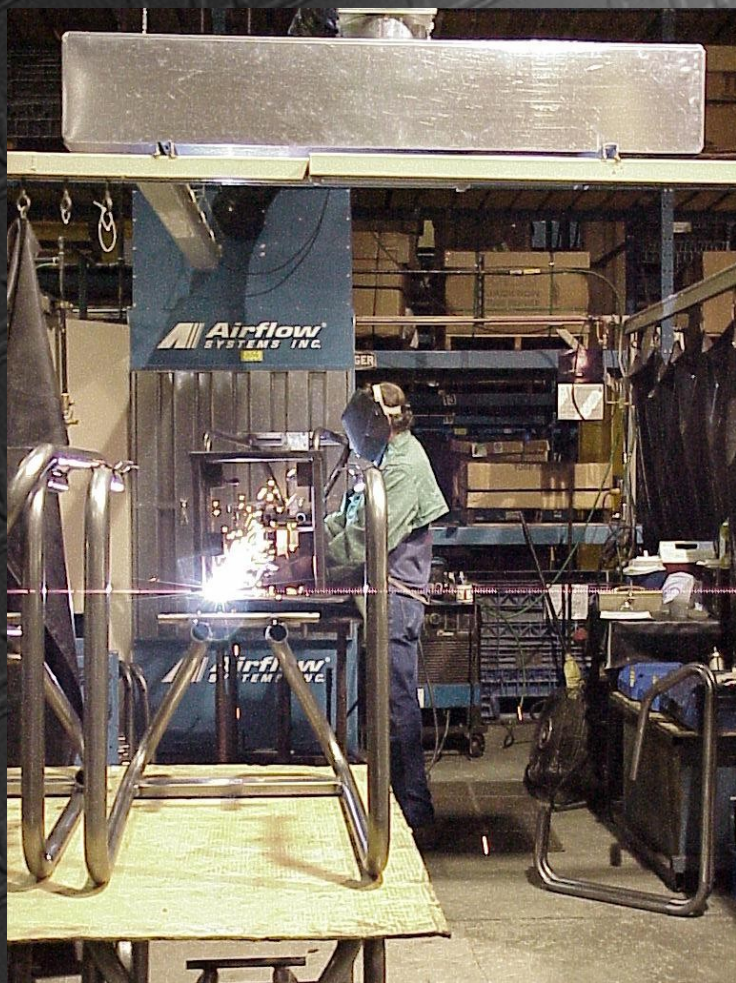


PlymoVent Strength

- ***Capture at the source***
- ***Vary amount of ventilation on a real time basis to meet ventilation demand.***
- ***Provide Filtration to allow for recirculation of air when applicable.***

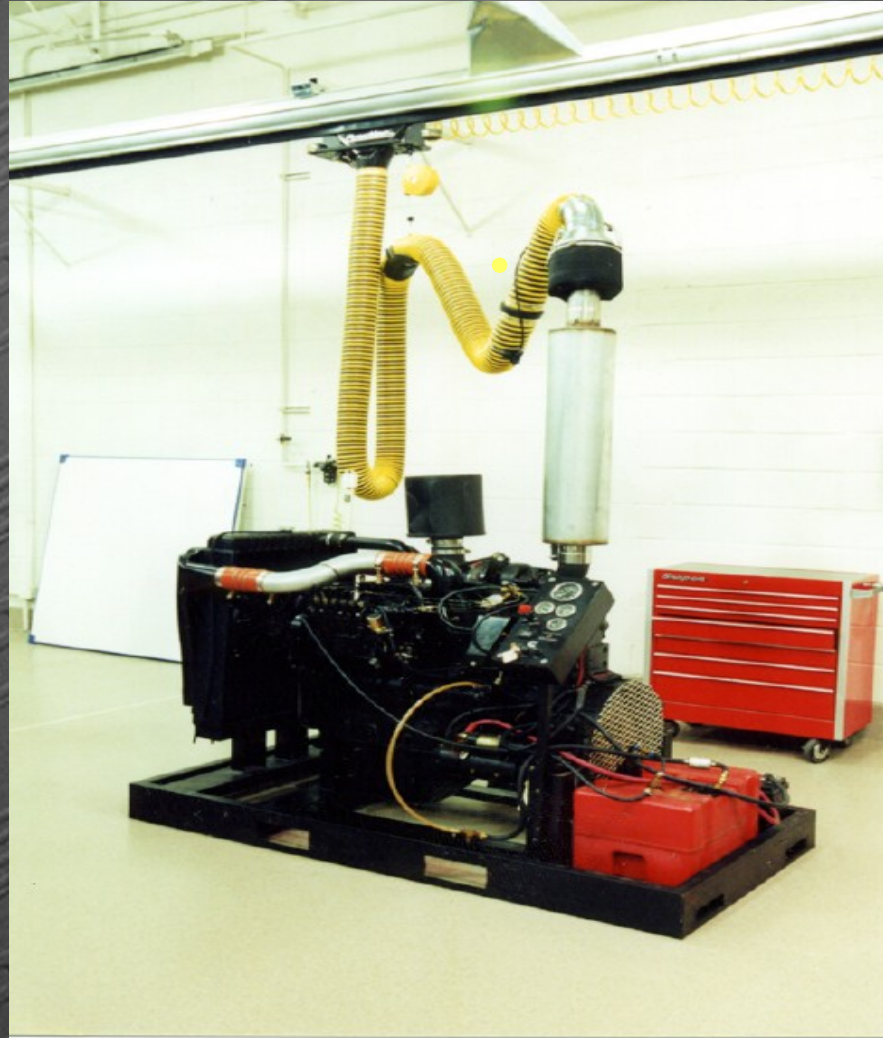
Source Capture

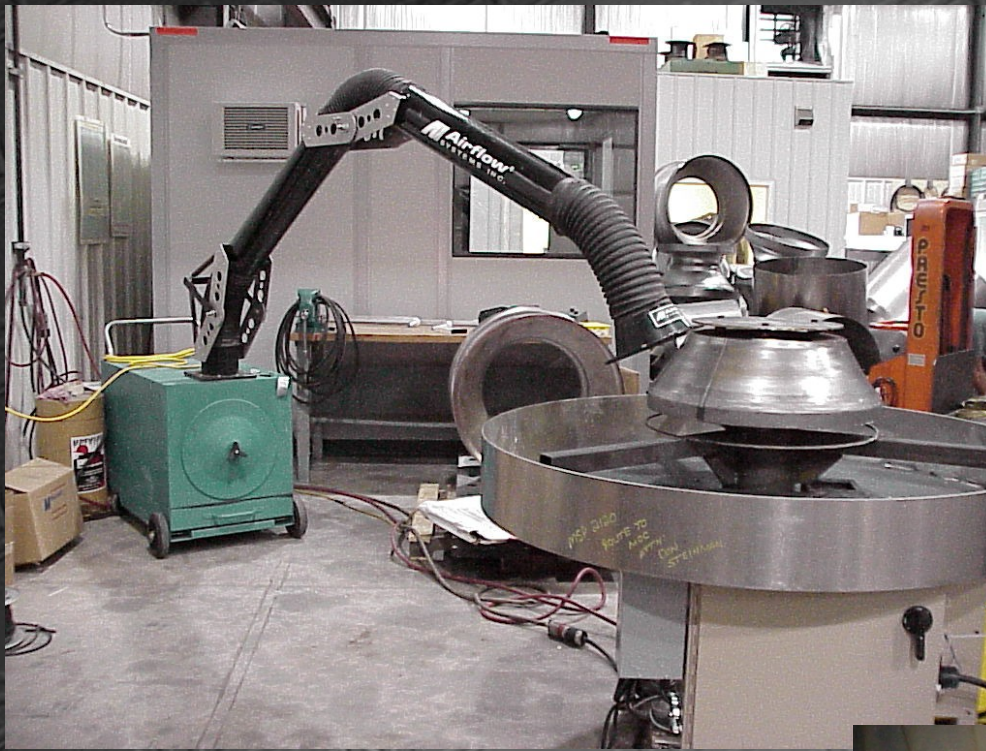






Vehicle Exhaust-Rail/Grabber







Emergency Vehicle Ventilation

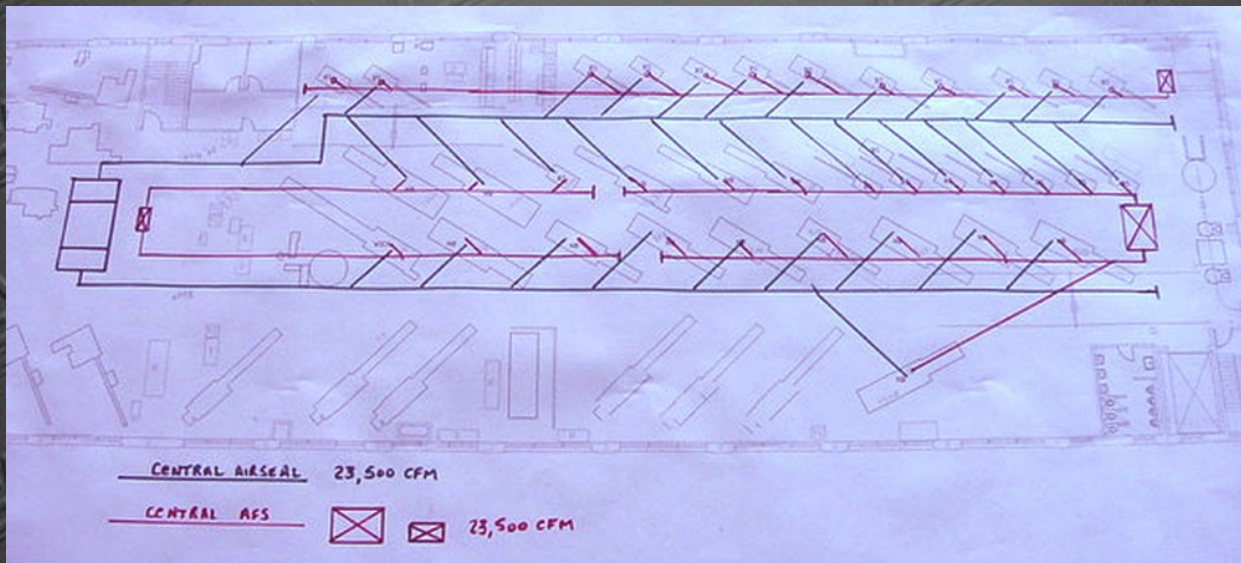


Drive-Thru Station



**Vehicles
Parked in
Tandem**

System Design Considerations



Collection System Design Considerations (Cont)

- ***Achievable exposure levels***
- ***Interface with process***
 - Interference with productivity
 - Ease of use
- ***Energy Impact on Facility***
- ***Maintenance & Operation cost***
- ***Payback***

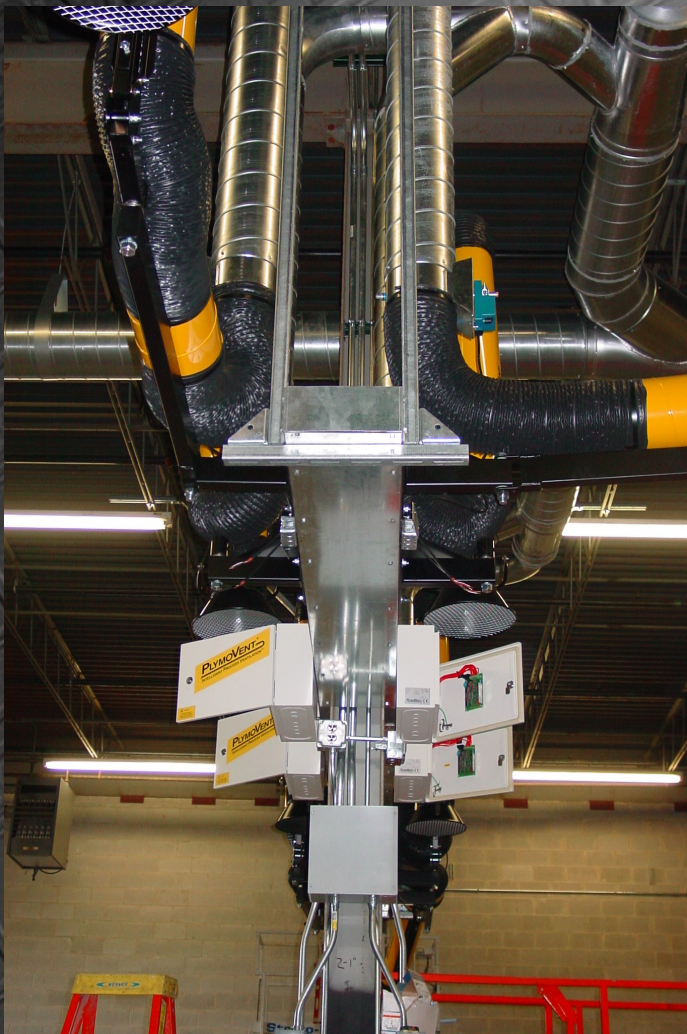
Advanced Controls

- *Size to operate for actual use with flexibility*
- *Use advanced controls to modulate systems*
- *Make up air (MUA) systems can be smaller*

Animation

Auto Start Mechanisms		Automated Dampers		VFD		Other Controls	
•Micro Switch for Hose Reels (MSR-24) •Pressure Switch for sensing engine starting (PC-500) •Inductive Sensor for welding (MCC-005) •Light sensor for welding (LS-12)	These system initiation devices are designed for starting systems and stopping systems so that operators can go about their normal tasks and the source capture systems become a part of their operations. This maximizes effectiveness, minimizes operating cost and maintains operator productivity all while improving air quality in a facility.	•Automated dampers -4" MD-100 -6" MD-160 -8" MD-200 -10" MD-250 -12" MD-315 -16" MD-400 •Heavy duty construction for high static pressure •Low Voltage 24 volt control with ICE-LC •Easy Installation with built in seal •ICE-LC has built in stepdown transformer and timer	Automated dampers in conjunction with auto start components allow for use of the source capture systems needed. This maximizes system effectiveness and minimizes operator errors and minimizes energy use.	•Variable Frequency Drives for 1.5 HP to 30 HP, 240 volt and 460 volt •Built in set-up for manual control, automated control using a pressure transmitter and remote start/stop.	A VFD used in conjunction with a pressure transmitter, automated dampers and damper controls will regulate a Plymovent source capture system to provide the right amount of air only at the locations where it is needed. For example, a 30 HP system may only run at 5 to 10 HP because of the actual arc time of the welding operations and modulation of dampers putting ventilation	•M-1000 control used for central control of fan for multiple source capture drops with automated on/off devices. Used in conjunction with ES-90 or ASE-12 and initiation devices the fan will start automatically and shut down automatically. There is also an adjustable overrun timer to delay shut down of the fan. •SA-24 used to control Fan and Light Kit from switches mounted to the hood of an arm. •ES-90 used for control of individual fan on individual source capture device using automatic on/off device. A manual override is also included.	
 Micro Switch  Light Sensor	 Pressure Switch  Inductive Sensor	 Automated Dampers 4",6",8",12",16"	 ICE-LC Damper Controls (replaces ASE-12)	 VFD	 Pressure Transmitter	 M-1000 For Central Fan  SA-24 for Fan and Light Kit operation From Arm  ES-90	

Energy Savings Control Solutions



Summary

- ***Consider IAQ and Energy Efficiency When providing facilities for manufacturing.***
- ***Change sales and implementation process and in turn thought process to implement IAQ and Energy Efficiency Projects.***
- ***Budgets for Improvements and Utility Costs come from different places.***
- ***Educate the accountants and managers on the benefits of good IAQ and Energy Efficiency***

(They really do not add cost to the overall bottom line)

Thank You!

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